

Oxytocin as a Cytokine Modulator and the Use of Oxytocin to Address Pre-eclampsia

15 February 2025

Simon Edwards

Research Acceleration Initiative

Introduction

Each year, millions of women experience the dangerous condition known as pre-eclampsia and experience high blood pressure as a result. In many cases, women die in the process of giving birth due to a poor overall understanding of both pre-eclampsia as well as the chemical cascade which triggers what is known as 'labor.'

Abstract

In order to properly understand pre-eclampsia, one must understand the dynamics of the initiation of labor as well as why it is that pre-term labor may occur.

The umbilical cord, contrary to conventional wisdom, is more than just bridge which permits for oxygenated blood and nutrients to be conveyed to a fetus. The umbilical cord, I would posit, produces its own chemical signals which affect the endocrine system of both mother and fetus and the characteristics of the introduction of these chemical signals are unique to the DNA of the mother. This is why pre-eclampsia is hereditary and why women who experience the condition once tend to experience it again. What, precisely, triggers the condition, is not properly understood.

When labor is naturally triggered, cytokines are produced within the umbilical cord which result in the constriction of blood vessels within the cord which results in decreased oxygenation of fetal tissues. When this occurs, the fetus responds by producing its own oxytocin which performs two functions: The first function of the oxytocin is to reduce the cytokine production in the umbilical cord so that full blood-flow may be restored. The second is to trigger the spasms associated with labor in the mother.

In order for this process to work properly, the cytokine production must be sufficiently acute that blood flow is not cut off entirely (resulting in still-birth) but it must be sufficiently acute that the fetus will respond with a sufficient surge in oxytocin to trigger labor. Thus, labor is a process which begins with a natural clock-like process which is governed epigenetically in the umbilical cord tissue which, in turn, prompts the fetus to produce oxytocin which is then conveyed back through the umbilical cord to the uteran tissue. This is why first pregnancies tend to run longer than full-term (because the cord tissue produces lower-grade cytokines surges) and why multiple-birth pregnancies tend to run slightly shorter in duration than full-term (because there is a greater overall volume of cord tissue and thus a greater quantity of cytokines.)

I would suggest that pre-eclapmsia results from umbilical cord tissue introducing cytokines on a low-grade basis which does not prompt labor and

does not prompt sufficient oxytocin production in the fetus. Without oxytocin to modulate the cytokine production process, the level of cytokines in the circulatory system of both mother and fetus continues to rise to dangerous levels and this process often proceeds indefinitely as cytokine resistance sets in within the fetus, result in ever-increasing levels of cytokines being required to prompt oxytocin production. In some cases, this natural process of oxytocin release does eventually roar into action, but in other unfortunate cases, it never does, resulting in both lethal pre-eclampsia and a failure of the labor process to proceed.

Localized introduction of oxytocin may be an effective remedy for the undesired production of cytokines within umbilical cord tissue. Unfortunately, the introduction of oxytocin, synthetic or otherwise, would also have the effect of inducing labor, potentially pre-term.

If one wished to re-program the genetic code of the umbilical cord tissue of those with the genetic pre-disposition for this condition, one would wish to re-program it so that the umbilical cord tissue would produce abrupt bursts of cytokines rather than the inappropriate low-grade releases of cytokines which I would posit underpin pre-eclampsia.

Another potential treatment approach would be to introduce a synthetic variant of oxytocin with an extremely short chemical half-life directly into the umbilical tissue so that umbilical cytokine production could be halted without having the undesired effect of inducing labor.

Conclusion

Pre-eclampsia is a noteworthy and under-explored medical phenomena which, if more comprehensively understood, would represent a medical advancement which would reduce the risks associated with pregnancy and have the result of decreasing fetal mortality.